

3. Upon information and belief, LG USA is a corporation organized under the laws of the State of Delaware, with regular and established places of business in Texas at least at 21251-2155 Eagle Parkway, Fort Worth, Texas 76177; 14901 Beach St, Fort Worth, TX 76177; and 9420 Research Blvd, Austin, Texas 78759. LG USA has at least one regular and established places of business in this District.

4. Upon information and belief, LG KR was spun off from its predecessor LG Electronics Investment Ltd. in 2002. LG and its subsidiaries are made up of five business segments: Home Appliance & Air Solutions, Home Entertainment, Mobile Communications, Vehicle component Solutions and Business Solutions. The Mobile Communications segment of LG “manufactures and sells mobile communication equipment,” including importing, distributing, and selling mobile phones in the U.S. *See Consolidated Interim Financial Statements*, LG ELECTRONICS, INC. (September 20, 2019), at p. 9, *available at* https://www.lg.com/global/pdf/ir_report/LGE_19%203Q_consolidated_f_signed.pdf. LG is a publicly traded company and is listed on the Korea stock exchange.

5. LG KR maintains a corporate presence in the United States via at least its wholly-owned, U.S.-based sales subsidiary LG USA, which is organized under the laws of Delaware with its principal place of business located at 1000 Sylvan Avenue, Englewood Cliffs, NJ, 07632, USA. Upon information and belief, LG USA also owns and controls LG Electronics Alabama, Inc. (an Alabama corporation) and LG Electronics Mobilecomm USA, Inc. (a California corporation, referred to herein as “LG Mobilecomm”). In 2018, LG Mobilecomm was merged into LG USA.

6. Upon information and belief, LG KR and its U.S.-based subsidiaries (which act as part of a global network of overseas sales and manufacturing subsidiaries on behalf of LG) have operated as agents of one another and vicariously as parts of the same business group to work in

concert together and enter into agreements that are nearer than arm's length. For example, LG KR, alone and via at least LG USA's activities, conducts business in the United States, including importing, distributing, and selling mobile phones that incorporate devices, systems, and processes that infringe the Asserted Patents in Texas and this judicial district. *See Trois v. Apple Tree Auction Center, Inc.*, 882 F.3d 485, 490 (5th Cir. 2018) ("A defendant may be subject to personal jurisdiction because of the activities of its agent within the forum state...."); *see also Cephalon, Inc. v. Watson Pharmaceuticals, Inc.*, 629 F. Supp. 2d 338, 348 (D. Del. 2009) ("The agency theory may be applied not only to parents and subsidiaries, but also to companies that are 'two arms of the same business group,' operate in concert with each other, and enter into agreements with each other that are nearer than arm's length.").

7. Through offers to sell, sales, imports, distributions, and other related agreements to transfer ownership of LG's mobile phones with distributors and customers operating in and maintaining a significant business presence in the U.S. and/or its U.S. subsidiary LG USA, LG does business in the U.S., the state of Texas, and in the Eastern District of Texas.

JURISDICTION AND VENUE

8. This action arises under the patent laws of the United States, namely 35 U.S.C. §§ 271, 281, and 284-285, among others.

9. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

10. Upon information and belief, LG KR is subject to this Court's specific and general personal jurisdiction pursuant to due process and/or the Texas Long Arm Statute, due at least to its substantial business in this State and judicial district, including: (A) at least part of its infringing activities alleged herein; and (B) regularly doing or soliciting business, engaging in other persistent

conduct, and/or deriving substantial revenue from infringing goods offered for sale, sold, and imported, and services provided to Texas residents vicariously through and/or in concert with its alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers. For example, LG has “operations in more than 100 locations around the world” in a group made up of 134 subsidiaries (among other associates and joint ventures), including those subsidiaries having a significant business presence in the U.S. *See Company Information*, LG ELECTRONICS, INC., <https://www.lg.com/global/investor-relations-company-info> (last visited Feb. 27, 2020).

11. This Court has personal jurisdiction over LG KR, directly or through intermediaries, distributors, importers, customers, subsidiaries, and/or consumers including its U.S. based, wholly-owned subsidiary, LG USA. Through direction and control of this subsidiary, LG KR has committed acts of direct and/or indirect patent infringement within Texas, and elsewhere within the United States, giving rise to this action and/or has established minimum contacts with Texas such that personal jurisdiction over LG KR would not offend traditional notions of fair play and substantial justice.

12. LG USA is a wholly owned subsidiary of LG. *See Consolidated Interim Financial Statements*, LG ELECTRONICS, INC. (September 20, 2019), at pp. 16-17, *available at* https://www.lg.com/global/pdf/ir_report/LGE_19%203Q_consolidated_f_signed.pdf. LG KR describes LG USA’s major business as its “sales of electronic products” in the United States. *Id.* Upon information and belief, LG KR has a 100% controlling ownership interest in LG USA and maintains more than half of LG USA’s voting rights as its basis for control. *Id.* Upon information and belief, LG compensates LG USA for its sales support services in the United States. As such, LG has a direct financial interest in LG USA, and vice versa.

13. With respect to the '152 patent, '569 patent, '723 patent, and '453 patent, the Accused Products comprise LTE-enabled phones that are configured to utilize infringing licensed assisted access (LAA) modems on wireless networks and other LG phones that are configured to perform inter-RAT handovers, such phones include, but are not limited to, the LG V30, V30+, V30S ThinQ, G7 ThinQ, V35 ThinQ, V40 ThinQ, G8 ThinQ, V50 ThinQ, and V60 ThinQ. With respect to the '658 patent, the Accused Products comprise LG display devices, including mobile phones, that include a processor configured to provide augmented reality features, such as AR Sticker, such devices include, but are not limited to, the LG G7, LG G8, LG V30, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ, and LG V60 ThinQ. With respect to the '457 and '059 patents, the Accused Products comprise LG display devices, including mobile phones, that are configured to support various video coding operations, such as Open CL 2.0 and H.265 (HEVC), such devices include, but are not limited to the LG V20, LG G5, LG Q8, LG G6, LG Q9, LG G7 Fit, LG V30, LG V30+, LG V30S, LG G7 One, LG Q70, LG G7, LG V35, LG V40, LG G8, LG G8X, LG G8S, LG V50, LG V50S, LG V60, and LG televisions equipped with LG webOS TV. Upon information and belief, LG KR controls or otherwise directs and authorizes all activities of LG USA, including LG USA's using, offering for sale, selling, and/or importing the Accused Products, their components, and/or products containing the same that incorporate the fundamental technologies covered by the Asserted Patents. LG USA is authorized to import, distribute, sell, or offer for sale the Accused Products on behalf of its controlling parent LG KR. For example, LG KR researches, designs, develops, and manufactures mobile phones and then directs LG USA to import, distribute, offer for sale, and sell the Accused Products in the United States. *See, e.g., United States v. Hui Hsiung*, 778 F.3d 738, 743 (9th Cir. 2015) (finding that the sale of infringing products to third parties rather than for direct import into the U.S. did not "place [defendants']

conduct beyond the reach of United States law [or] escape culpability under the rubric of extraterritoriality”). Furthermore, LG USA also administers, on behalf of LG KR, requests for service under and any disputes arising from LG’s limited warranty of LG’s products sold in the U.S., including in Texas and this judicial district. *See, e.g., User Guide LG G7 ThinQ, LM-G210TM*, LG, pp. 202-204, available at <http://gscs-b2c.lge.com/downloadFile?fileId=EnTAsmzn9Y5WNZqf0T7sQ> (“Procedure for Resolving Disputes” under LG’s Limited Warranty). Thus, LG USA conducts infringing activities on behalf of LG.

14. Upon information and belief, LG USA’s corporate presence in the United States gives LG substantially the business advantages that it would have enjoyed if it conducted its business through its own offices or paid agents in the state. Upon information and belief, LG USA is authorized to import, distribute, sell, and offer for sale LG’s products, including mobile phones incorporating infringing devices and processes, on behalf of LG KR. For example, LG USA operates within LG’s global network of sales subsidiaries in North and South America, Europe, Asia, Africa, and the Middle East. In the U.S., including within the Eastern District of Texas, LG’s mobile phones, which incorporate infringing devices and processes, are imported, distributed, offered for sale, and sold.

15. Via LG’s alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers maintaining a business presence, operating in, and/or residing in the U.S., LG’s products, including products and processes accused of infringing the Asserted Patents, are or have been widely distributed and sold in retail stores, both brick and mortar and online, in Texas including within this judicial district. *See Litecubes, LLC v. Northern Light Products, Inc.*, 523 F.3d 1353, 1369-70 (Fed. Cir. 2008) (“[T]he sale [for purposes of § 271] occurred at the location of the buyer.”); *see also Semcon IP Inc. v. Kyocera Corp.*, No. 2:18-cv-

00197-JRG, 2019 WL 1979930, at *3 (E.D. Tex. May 3, 2019) (denying accused infringer's motion to dismiss because plaintiff sufficiently plead that purchases of infringing products outside of the United States for importation into and sales to end users in the U.S. may constitute an offer to sell under § 271(a)). For example, LG phones are sold to end users by LG's subsidiaries, distributors, and customers, including, but not limited to, LG USA, online and at retail stores located throughout the Eastern District of Texas.

16. Upon information and belief, LG KR has placed and continues to place infringing products and/or products that practice infringing processes into the stream of commerce via established distribution channels comprising at least subsidiaries and distributors, such as LG USA, and customers such as AT&T, Verizon, Sprint, and T-Mobile, with the knowledge and/or intent that those products are and/or will be imported, used, offered for sale, sold, and continue to be sold in the United States and Texas, including in this judicial district. For example, in 2018 LG reported 16,208 billion KRW (about 13.42 billion USD) in world-wide net sales in its Mobile Communications division. *See Consolidated Financial Statements*, LG ELECTRONICS, INC. (December 31, 2018), at p. 58, *available at* https://www.lg.com/global/pdf/ir_report/LGE_18%204Q_consolidated_f_signed.pdf. Of that amount, LG USA (combined with LG Mobilecomm) had 12,184 billion KRW (about 10.09 billion USD) in U.S. sales of LG products and services. *See id.* at p. 24. As a result, LG has, vicariously through and/or in concert with its alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers, placed infringing LG phones and related wireless network services into the stream of commerce via established distribution channels with the knowledge and/or intent that those products were sold and continue to be sold in the United States and Texas, including in this judicial district.

17. In the alternative, the Court has personal jurisdiction over LG KR under Federal Rule of Civil Procedure 4(k)(2), because the claims for patent infringement in this action arise under federal law, LG KR is not subject to the jurisdiction of the courts of general jurisdiction of any state, and exercising jurisdiction over LG KR is consistent with the U.S. Constitution.

18. Venue is proper in this judicial district pursuant to 28 U.S.C. § 1391 because, among other things, LG KR is not a resident in the United States, and thus may be sued in any judicial district, including this one, pursuant to 28 U.S.C. § 1391(c)(3). *See In re HTC Corp.*, 889 F.3d 1349, 1357 (Fed. Cir. 2018) (“The Court’s recent decision in *TC Heartland* does not alter” the alien-venue rule.).

19. On information and belief, LG USA is subject to this Court’s specific and general personal jurisdiction pursuant to due process and/or the Texas Long Arm Statute, due at least to its substantial business in this State and judicial district, including: (A) at least part of its own infringing activities alleged herein; and (B) regularly doing or soliciting business, engaging in other persistent conduct, and/or deriving substantial revenue from infringing goods offered for sale, sold, and imported and services provided to Texas residents. LG USA has conducted and regularly conducts business within the United States and this District. LG USA has purposefully availed itself to the privileges of conducting business in the United States, and more specifically in Texas and this District. LG USA has sought protection and benefit from the laws of the State of Texas by placing infringing products into the stream of commerce through an established distribution channel with awareness and/or intent that they will be purchased by consumers in this District.

20. Venue is proper in this judicial district pursuant to 28 U.S.C. § 1391 because, among other things, LG USA has regular and established places of business in this District,

including at least 21251-2155 Eagle Parkway, Fort Worth, Texas 76177 and 14901 Beach St, Fort Worth, TX 76177.

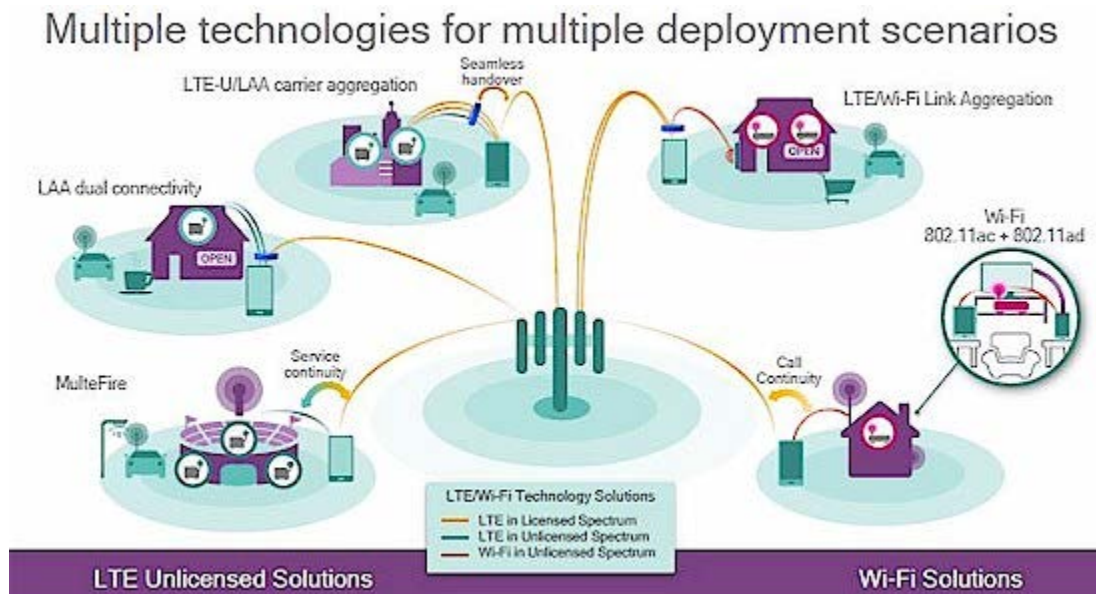
THE ASSERTED PATENTS AND TECHNOLOGY

21. The Asserted Patents were invented by employees of Panasonic Corporation (“Panasonic”). Founded in 1918, Panasonic has been at the forefront of the electronics industry for over a century. Panasonic made numerous innovations in the home appliance, battery, mobile phone, and television industries. Indeed, Panasonic’s invention of the “Paper Battery” in 1979 is widely credited as enabling the compact electronics of today. In 1991, Panasonic released the Mova P, the smallest and lightest mobile phone on the market, which revolutionized the industry by showing the demand for a compact, lightweight device. Panasonic also produced the first wide-format plasma display and developed the first digital television for the U.S. market. Panasonic’s history of innovation is also borne out by its intellectual property. Indeed, a search of the USPTO database where the patent assignee is “Panasonic” yields over 27,000 matches.

22. Upon information and belief, a significant portion of the revenue of LG is derived from the manufacture and sale of mobile phones. LG’s mobile phones are utilized in wireless networks. These wireless networks utilize a variety of radio access technologies (“RAT”), including, but not limited to, UTRAN, GERAN, E-UTRAN, WLAN, 3GPP access systems, and non-3GPP access systems. LG’s mobile phones are configured to support these RATs to hand over communication connections between different RAT systems to provide seamless communication for mobile phone users.

23. Certain Accused Products, including at least the LG V30, V30+, V30S ThinQ, G7 ThinQ, V35 ThinQ, V40 ThinQ, G8 ThinQ, V50 ThinQ, and V60 ThinQ, utilize a cellular modem that is enabled for Licensed Assisted Access (LAA), which is a key feature of LTE-Advanced and

a technical plank of 5G. Such Accused Products are used in LAA networks of multiple deployment scenarios in which LAA SCells (small cells using unlicensed LTE spectrum) are included in LAA PCells (primary or macro cells using LTE licensed spectrum). The LAA networks have a first cell using a first communication protocol (i.e., the LAA PCell) and a plurality of second cells (i.e., the SCells) which are included in the first cell, such as cellular LTE-A and 5G networks with LAA. The second cells use a second communication protocol which is different from that for the first cell. Below is an illustration of an LAA implemented in multiple technologies for multiple deployment scenarios.



See *LTE-U vs. Wi-Fi: What You Need To Know*, SMALLNETBUILDER, <https://www.smallnetbuilder.com/wireless/wireless-features/33090-lte-u-vs-wi-fi-whatyou-need-to-know> (last visited Mar. 3, 2020).

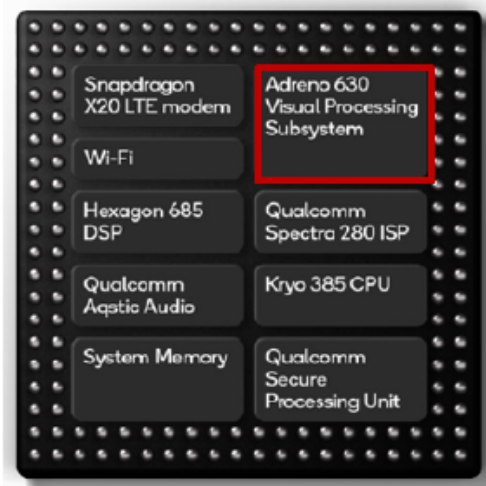
24. For example, Accused Products, such as the LG V40 mobile phone, utilize a Qualcomm Snapdragon mobile platform that uses an Adreno GPU for video coding operations.

Qualcomm® Snapdragon™ 845 Mobile Platform

Features & Specifications¹

Visual Processing Subsystem

- Qualcomm® Adreno® 630 Visual Processing Subsystem
- Open GL ES 3.2, Open CL 2.0, Vulkan, DirectX 12
- Ultra HD Premium video playback and encoding @ 4K (3840x2160) 60fps, 10bit HDR, Rec 2020 color gamut
- Slow motion HEVC video encoding of either HD (720p) video up to 480fps or FHD (1080p) up to 240fps
- H.264 (AVC), H.265 (HEVC), VP9, DisplayPort over USB Type-C support
- eXtended Reality (XR)
 - Room-Scale 6DoF with simultaneous localization and mapping (SLAM)
 - 2400x2400 @ 120 FPS per eye
 - Adreno Foveation: multiple technology advancements for multi-view, tile-based foveation with eye-tracking and fine grain preemption



<https://www.qualcomm.com/media/documents/files/snapdragon-845-mobile-platform-product-brief.pdf>

25. The Adreno GPU supports an OpenCL framework, which is used for heterogeneous processing and supports parallel wavefront processing. The Accused Devices provide a mobile platform that uses the Adreno GPU to perform plural processes (i.e., waveform parallel processing) on a coded bitstream obtained by dividing an image into blocks of various pixel dimensions and coding the image on a block-by-block basis. The plural processes performed by the Adreno GPU are pipelined.

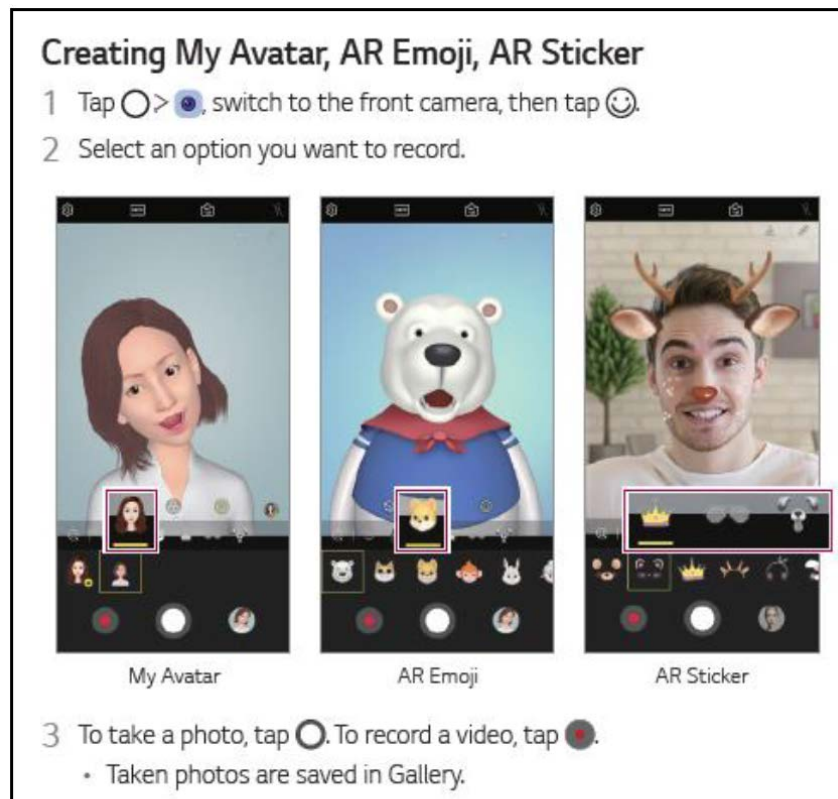
The Adreno OpenCL platform has support for out-of-order command queues. However, there is a greater overhead due to the dependency management required for implementing out-of-order command queues. The Adreno software pipelines commands sent to an in-order queue. Therefore, it is good practice to use in-order command queues rather than out-of-order command queues.

The maximum number of waves that can be pipelined in the workgroup is hardware dependent. Typically, Adreno GPUs support up to 16 waves.

https://developer.qualcomm.com/qfile/33472/80-nb295-11_a.pdf

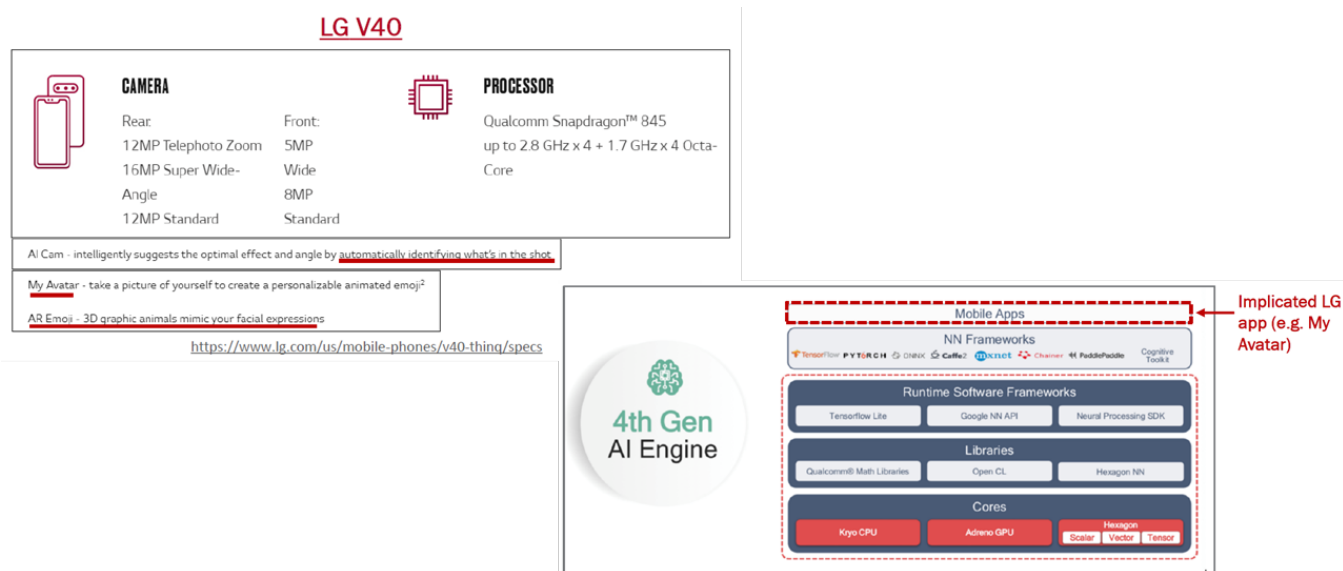
26. The Adreno GPUs in the Accused Products also have a control unit that divides the coded bitstream into slices that are further partitioned into blocks having the same number of image pixels.

27. The Accused Products, such as the LG V40 ThinQ and LG ThinQ, perform image processing including augmented reality features. The Accused Products include LG's "AR Sticker" application:



<http://gscs-b2c.lge.com/downloadFile?fileId=Ju2TSKqGyzu4uoBWJIGimA>
(LG V40 ThinQ User Guide)

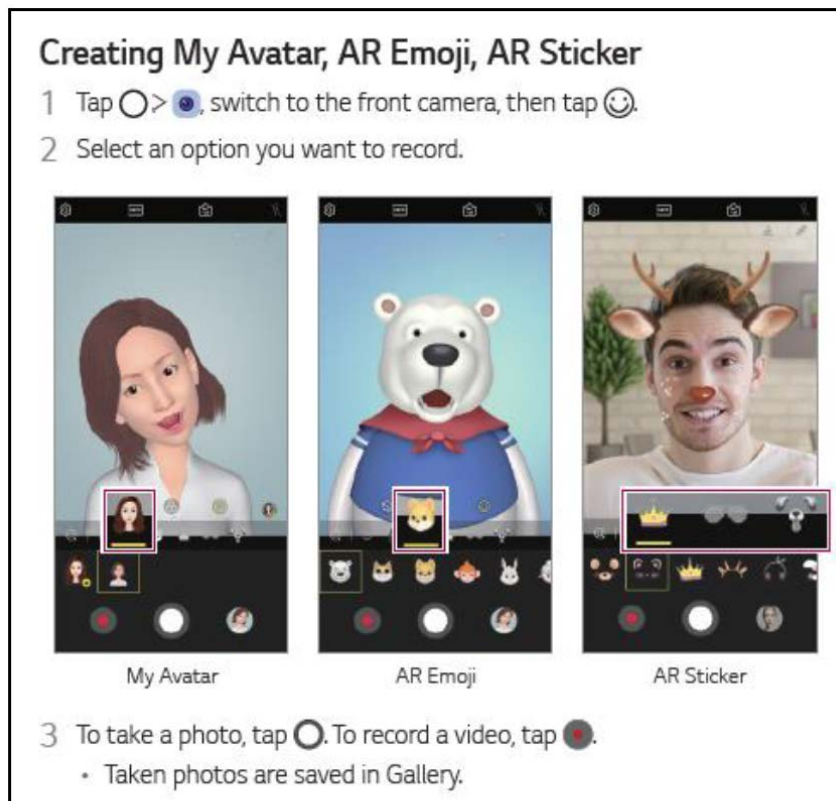
28. The Accused Products use a neural network, such as, Qualcomm's Artificial Intelligence Engine ("AI Engine")—Neural Processing SDK, to perform the AI vision applications.



29. The Accused Products detect a position of a human body part area in an input image that includes user's body image. For example, the AR Sticker application detects the position of the user's nose in an input image of the user's face.

30. The Accused Products determine an arrangement information of an ornament image (e.g., an AR sticker) according to a determined point of origin and a move locus that corresponds to the size of the body part area.

31. The Accused Products generate an output image comprising the ornament image (e.g., antlers) and the input image.



<http://gscs-b2c.lge.com/downloadFile?fileId=Ju2TSKqGyzu4uoBWJIGimA>
(LG V40 ThinQ User Guide)

COUNT I

(INFRINGEMENT OF U.S. PATENT NO. 8,374,152)

32. Plaintiff incorporates paragraphs 1 through 31 herein by reference.

33. SPV is the assignee of the '152 patent, entitled "Cell Selection System, Cell Selection Method, and Mobile Terminal," with ownership of all substantial rights in the '152 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

34. The '152 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '152 patent issued from U.S. Patent Application No. 12/739,883.

35. LG has and continues to directly and/or indirectly infringe (by inducing infringement) one or more claims of the '152 patent in this judicial district and elsewhere in Texas and the United States.

36. Upon information and belief, LG designs, develops, manufactures, assembles, and markets mobile phones and devices configured to connect to wireless cellular networks. *See Cell Phones*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones> (last visited Mar. 3, 2020) (scroll to "Shop by Carrier/Network" heading).

37. LG directly infringes the '152 patent via 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '152 patent to, for example, its alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers. Furthermore, upon information and belief, LG sells and makes the Accused Products outside of the United States, delivers those products to its customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products are destined for the United States and/or designs those products for sale in the United States, thereby directly infringing the '152 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013). Furthermore, LG directly infringes the '152 patent through its direct involvement in the activities of its subsidiaries, including LG USA, including by selling and offering for sale the Accused Products directly to LG USA and importing the Accused Products into the United States for LG USA. Upon information and belief, LG USA conducts activities that constitute direct infringement of the '152 patent under 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those

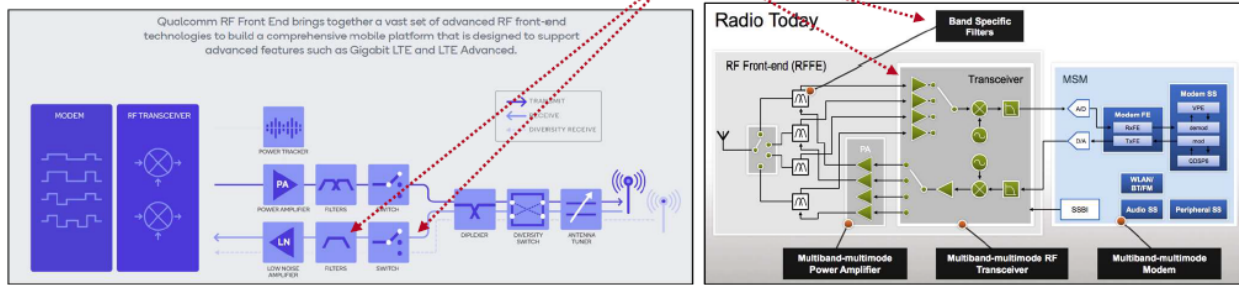
Accused Products. For example, and upon information and belief, LG offers for sale, sells, and imports the Accused Products within the U.S. to, for example, its distributors, customers, subsidiaries, importers, and/or consumers. Further, LG is vicariously liable for this infringing conduct of LG USA (under both the alter ego and agency theories) because, as an example and upon information and belief, LG and LG USA are essentially the same company, and LG has the right and ability to control LG USA's infringing acts and receives a direct financial benefit from LG USA's infringement.

38. For example, LG infringes claim 9 of the '152 patent via the Accused Products such as LG V30, V30+, V30S ThinQ, G7 ThinQ, V35 ThinQ, V40 ThinQ, G8 ThinQ, V50 ThinQ, and V60 ThinQ which are configured to connect to wireless cellular networks.

39. The Accused Products comprise a mobile terminal used in a network having a first cell using a first communication protocol and a plurality of second cells which are included in the first cell and use a second communication protocol which is different from that for the first cell, the mobile terminal supporting communications using the first and second communication protocols in both the first and second cells. Each of the Accused Products are mobile phones that are configured to operate in LTE cells including a plurality of LAA cells. LTE cells and LAA cells use different communication protocols.

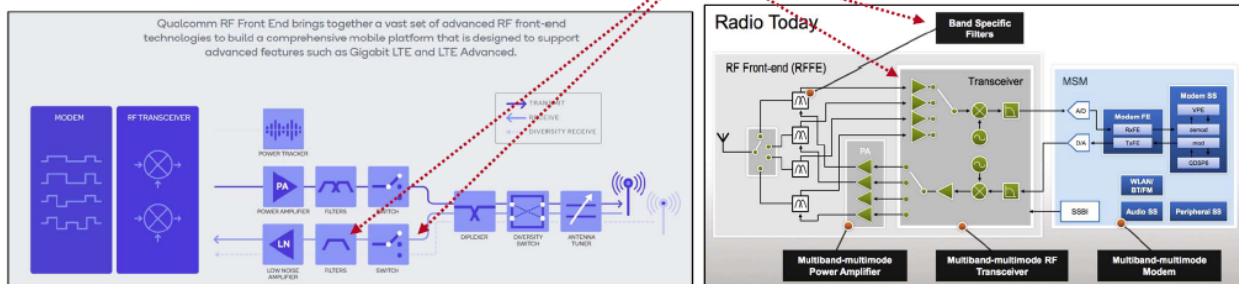
40. The Accused Products comprise a first broadcast information receiver for receiving broadcast information of the first cell including cell selection information comprising a common parameter that is commonly used for a judgment on cell selection of all the second cells. For example, the Accused Products include first receiver circuitry that is configured to receive over licensed LTE spectrum cell selection information comprising a common parameter that is commonly used for a judgment on cell selection of all the second cells from the LTE cell.

Use of RF switches, switch modules, and embedded discrete band filters is illustrative of identified LG LAA UE having a mobile platform that includes a first receiver comprising a distinct receive path for licensed LTE traffic



41. The Accused Products comprise a second broadcast information receiver for receiving broadcast information of one of the second cells including an individual parameter that is individually used for a judgment on cell selection of a second cell. For example, the Accused Products include second receiver circuitry that is configured to receive over unlicensed LTE spectrum an individual parameter that is individually used for a judgment on cell selection of a second cell from an LAA cell.

Use of RF switches, switch modules, and embedded discrete band filters is illustrative of identified LG LAA UE having a mobile platform that includes a second receiver comprising a distinct receive path for unlicensed LTE traffic



42. The Accused Products comprise a first broadcast information processor for reading the common parameter from the broadcast information of the first cell. For example, the Accused Products include a multi-core baseband processor, in which a processor core reads the common parameter from the broadcast information of the LTE cell.

43. The Accused Products comprise a second broadcast information processor for reading the individual parameter from the broadcast information of the second cell. For example,

the Accused Products include a multi-core baseband processor, in which a processor core reads the individual parameter from the broadcast information of the LAA cell.

44. The Accused Products comprise a cell change controller for judging by the common and individual parameters whether to change a communication connection of the mobile terminal from the first cell to the second cell. For example, the Accused Products include a baseband processor programmed to judge using the common and individual parameters whether to change a communication connection from the LTE cell to the LAA cell.

45. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

46. At a minimum, LG has known of the '152 patent at least as early as the filing date of the complaint. In addition, LG has known about the '152 patent since at least April 14, 2020, when LG received a letter providing notice of its infringement. Further, on information and belief, LG's conduct before the United States Patent and Trademark Office ("USPTO") and foreign offices, suggest that it may have been aware of the '152 patent prior to receiving the letter. For example, in prosecuting U.S. Patent Application No. 14/361,628, LG disclosed the family associated with the '152 patent to the USPTO.

47. Upon information and belief, since at least the above-mentioned date when LG was on notice of its infringement, LG has actively induced, under U.S.C. § 271(b), its distributors, customers, subsidiaries, importers, and/or consumers that import, purchase, or sell the Accused Products that include or are made using all of the limitations of one or more claims of the '152 patent to directly infringe one or more claims of the '152 patent by using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned date, LG does so with knowledge, or with willful blindness of the fact, that the induced acts

constitute infringement of the '152 patent. Upon information and belief, LG intends to cause, and has taken affirmative steps to induce infringement by distributors, importers, customers, subsidiaries, and/or consumers by at least, *inter alia*, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, testing wireless networking features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. *See, e.g., Global Network*, LG ELECTRONICS INC., <http://www.lgnewsroom.com/global-network/north-america/> (last visited Mar. 3, 2020) (stating that “[t]he company has been very active in the [North American] region as an exemplary model of globalization with success in local plants, strategic alliances, and mergers and acquisitions” and listing LG’s U.S.-based subsidiaries).

48. Upon information and belief, despite having knowledge of the '152 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '152 patent, LG has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. LG’s infringing activities relative to the '152 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

49. SPV has been damaged as a result of LG’s infringing conduct described in this Count. LG is, thus, liable to SPV in an amount that adequately compensates SPV for LG’s

infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT II

(INFRINGEMENT OF U.S. PATENT NO. 8,442,569)

50. Plaintiff incorporates paragraphs 1 through 49 herein by reference.

51. SPV is the assignee of the '569 patent, entitled "Radio Reception Apparatus, Radio Transmission Apparatus, and Radio Communication Method," with ownership of all substantial rights in the '569 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

52. The '569 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '569 patent issued from U.S. Patent Application No. 13/202,600.

53. LG has and continues to directly and/or indirectly infringe (by inducing infringement) one or more claims of the '569 patent in this judicial district and elsewhere in Texas and the United States.

54. Upon information and belief, LG designs, develops, manufactures, assembles and markets mobile phones and devices configured to connect to wireless cellular networks. *See Cell Phones*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones> (last visited Mar. 3, 2020) (scroll to "Shop by Carrier/Network" heading).

55. LG directly infringes the '569 patent via 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '569 patent to, for example, its alter egos, agents, intermediaries, distributors, importers,

customers, subsidiaries, and/or consumers. Furthermore, upon information and belief, LG sells and makes the Accused Products outside of the United States, delivers those products to its customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products are destined for the United States and/or designing those products for sale in the United States, thereby directly infringing the '569 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013). Furthermore, LG directly infringes the '569 patent through its direct involvement in the activities of its subsidiaries, including LG USA, including by selling and offering for sale the Accused Products directly to LG USA and importing the Accused Products into the United States for LG USA. Upon information and belief, LG USA conducts activities that constitutes direct infringement of the '569 patent under 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products. For example, and upon information and belief, LG offers for sale, sells, and imports the Accused Products within the U.S. to, for example, its distributors, customers, subsidiaries, importers, and/or consumers. Further, LG is vicariously liable for this infringing conduct of LG USA (under both the alter ego and agency theories) because, as an example and upon information and belief, LG and LG USA are essentially the same company, and LG has the right and ability to control LG USA's infringing acts and receives a direct financial benefit from LG USA's infringement.

56. For example, LG infringes claim 11 of the '569 patent via the Accused Products such as LG V30, V30+, V30S ThinQ, G7 ThinQ, V35 ThinQ, V40 ThinQ, G8 ThinQ, V50 ThinQ, and V60 ThinQ which are configured to connect to wireless cellular networks.

57. The Accused Products implement the “[a] radio communication method in a radio reception apparatus which performs communication by using a plurality of resources defined in a frequency-time domain” of claim 11. Each of the Accused Products are mobile phones that receive radio communication from an LTE cell. When operated in certain cellular networks, the Accused Products use a plurality of resources defined in a frequency-time domain.

58. The Accused Products acquire distribution resource information for a second reference signal when the second reference signal for a second communication system is transmitted from a radio transmission apparatus in addition to transmitting a first reference signal for a first communication system, in a case where distributed type resources in which a resource unit defined in the frequency-time domain is divided in a time direction and distributedly allocated at predetermined frequency intervals are used as resources for the second reference signal. For example, the Accused Products include a modem that acquires distribution resource information (“DRS”) as a reference signal for a SCell (e.g., LTE over unlicensed spectrum) from a radio transmission apparatus (e.g., a base station) that transmits reference signals for the SCell and a PCell (e.g., LTE over licensed spectrum). Distributed type resources used for the DRS have resource units defined in the frequency-time domain and are divided in a time direction and distributedly allocated at predetermined frequency intervals.

59. The Accused Products receive a signal containing the second reference signal transmitted from the transmission apparatus. For example, the Accused Products include an LTE modem that contains an RF transceiver which is configured to receive the second reference signal from the transmission apparatus.

60. The Accused Products measure a channel quality of a transmission channel by using the second reference signal that is allocated in the distributed type resources on the basis of

the distribution resource information. For example, the Accused Products include an LTE modem and processor that measures a channel quality of a transmission channel by using the received DRS from the LAA SCell. The Snapdragon mobile platform utilized in the Accused Products contains components for measuring a channel quality.

61. The Accused Products transmit feedback information containing channel quality information indicative of the channel quality, to the transmission apparatus. For example, the Accused Products include an LTE modem that contains an RF transceiver which transmits feedback information containing channel quality information to the base station.

62. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

63. At a minimum, LG has known of the '569 patent at least as early as the filing date of the complaint. In addition, LG has known about the '569 patent since at least April 14, 2020, when LG received a letter providing notice of its infringement.

64. Upon information and belief, since at least the above-mentioned date when LG was on notice of its infringement, LG has actively induced, under U.S.C. § 271(b), its distributors, customers, subsidiaries, importers, and/or consumers that import, purchase, or sell the Accused Products that include or are made using all of the limitations of one or more claims of the '569 patent to directly infringe one or more claims of the '569 patent by using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned date, LG does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '569 patent. Upon information and belief, LG intends to cause, and have taken affirmative steps to induce infringement by distributors, importers, customers, subsidiaries, and/or consumers by at least, *inter alia*, creating advertisements that promote the

infringing use of the Accused Products, creating and/or maintaining established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, testing wireless networking features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. *See, e.g., Global Network*, LG ELECTRONICS INC., <http://www.lgnewsroom.com/global-network/north-america/> (last visited Mar. 3, 2020) (stating that “[t]he company has been very active in the [North American] region as an exemplary model of globalization with success in local plants, strategic alliances, and mergers and acquisitions” and listing LG’s U.S.-based subsidiaries).

65. Upon information and belief, despite having knowledge of the ’569 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the ’569 patent, LG has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. LG’s infringing activities relative to the ’569 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

66. SPV has been damaged as a result of LG’s infringing conduct described in this Count. LG is, thus, liable to SPV in an amount that adequately compensates SPV for LG’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT III

(INFRINGEMENT OF U.S. PATENT NO. 8,467,723)

67. Plaintiff incorporates paragraphs 1 through 66 herein by reference.

68. SPV is the assignee of the '723 patent, entitled "Base Station Apparatus, Mobile Apparatus, and Communication Method," with ownership of all substantial rights in the '723 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

69. The '723 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '723 patent issued from U.S. Patent Application No. 13/585,621.

70. LG has and continues to directly and/or indirectly infringe (by inducing infringement) one or more claims of the '723 patent in this judicial district and elsewhere in Texas and the United States.

71. Upon information and belief, LG designs, develops, manufactures, assembles and markets mobile phones and devices configured to connect to wireless cellular networks. *See Cell Phones*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones> (last visited Mar. 3, 2020) (scroll to "Shop by Carrier/Network" heading).

72. LG directly infringes the '723 patent via 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '723 patent to, for example, its alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers. Furthermore, upon information and belief, LG sells and makes the Accused Products outside of the United States, delivers those products to its customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the

Accused Products outside of the United States it does so intending and/or knowing that those products are destined for the United States and/or designing those products for sale in the United States, thereby directly infringing the '723 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013). Furthermore, LG directly infringes the '723 patent through its direct involvement in the activities of its subsidiaries, including LG USA, including by selling and offering for sale the Accused Products directly to LG USA and importing the Accused Products into the United States for LG USA. Upon information and belief, LG USA conducts activities that constitutes direct infringement of the '723 patent under 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products. For example, and upon information and belief, LG offers for sale, sells, and imports the Accused Products within the U.S. to, for example, its distributors, customers, subsidiaries, importers, and/or consumers. Further, LG is vicariously liable for this infringing conduct of LG USA (under both the alter ego and agency theories) because, as an example and upon information and belief, LG and LG USA are essentially the same company, and LG has the right and ability to control LG USA's infringing acts and receives a direct financial benefit from LG USA's infringement.

73. For example, LG infringes claim 9 of the '723 patent via the Accused Products such as LG V30, V30+, V30S ThinQ, G7 ThinQ, V35 ThinQ, V40 ThinQ, G8 ThinQ, V50 ThinQ, and V60 ThinQ among other LG phones sold during the statutory damages period that perform inter-RAT handovers and are configured to connect wireless cellular networks.

74. The Accused Products implement the "communication method performed by a mobile station apparatus that belongs to a first area, which is covered by a base station apparatus employing a first Radio Access Technology (RAT), the first area including part or entirety of a

second area which is covered by a host station employing a second RAT different from the first RAT” of claim 9. Each of the Accused Products is a mobile station that performs inter-RAT handovers, where the mobile station’s radio connection is switched from a first base station (e.g., LTE eNB) that employs a first RAT (e.g., LTE) to a second base station (e.g., RNC/NodeB) that employs a second (and different) RAT (e.g., GERAN/UTRAN). RAT handover scenarios include handovers between E-UTRAN (LTE) and UTRAN or GERAN (both 3G).

75. The Accused Products transmit, to the base station apparatus, notification information while the mobile station apparatus is using the first RAT when the mobile station apparatus detects that the mobile station apparatus is located in the second area while using the first RAT. For example, the Accused Products include a transmitter (e.g., an RF transceiver coupled to a RF front end and an antenna) to transmit notification information, e.g., measurement information, to the E-UTRAN eNB (i.e., the base station) which is using a first RAT (e.g., LTE). Such a transmission occurs when the mobile station detects that it is located in a second area (i.e., within a 3G radio cell while still connected to the LTE base station).

76. The Accused Products perform a handover based on traffic control by the base station apparatus using the notification information. For example, the Accused Products have a controller that is responsive to a handover message received from the LTE eNB, based on the notification information, i.e., the measurement information.

77. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

78. At a minimum, LG has known of the ’723 patent at least as early as the filing date of the complaint. In addition, LG has known about the ’723 patent since at least April 14, 2020, when LG received a letter providing notice of its infringement. Further, on information and belief,

LG's conduct before the United States Patent and Trademark Office ("USPTO") and foreign offices, suggest that it may have been aware of the '723 patent prior to receiving the letter. For example, in prosecuting U.S. Patent No. 9,131,491, LG disclosed the family associated with the '723 patent to the USPTO.

79. Upon information and belief, since at least the above-mentioned date when LG was on notice of its infringement, LG has actively induced, under U.S.C. § 271(b), its distributors, customers, subsidiaries, importers, and/or consumers that import, purchase, or sell the Accused Products that include or are made using all of the limitations of one or more claims of the '723 patent to directly infringe one or more claims of the '723 patent by using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned date, LG does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '723 patent. Upon information and belief, LG intends to cause, and have taken affirmative steps to induce infringement by distributors, importers, customers, subsidiaries, and/or consumers by at least, *inter alia*, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, testing wireless networking features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. *See, e.g., Global Network*, LG ELECTRONICS INC., <http://www.lgnewsroom.com/global-network/north-america/> (last visited Mar. 3, 2020) (stating that "[t]he company has been very active in the [North

American] region as an exemplary model of globalization with success in local plants, strategic alliances, and mergers and acquisitions” and listing LG’s U.S.-based subsidiaries).

80. Upon information and belief, despite having knowledge of the ’723 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the ’723 patent, LG has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. LG’s infringing activities relative to the ’723 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

81. SPV has been damaged as a result of LG’s infringing conduct described in this Count. LG is, thus, liable to SPV in an amount that adequately compensates SPV for LG’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT IV

(INFRINGEMENT OF U.S. PATENT NO. 8,792,453)

82. Plaintiff incorporates paragraphs 1 through 81 herein by reference.

83. SPV is the assignee of the ’453 patent, entitled “Secure Tunnel Establishment Upon Attachment or Handover to an Access Network,” with ownership of all substantial rights in the ’453 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

84. The '453 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '453 patent issued from U.S. Patent Application No. 13/126,924.

85. LG has and continues to directly and/or indirectly infringe (by inducing infringement) one or more claims of the '453 patent in this judicial district and elsewhere in Texas and the United States.

86. Upon information and belief, LG designs, develops, manufactures, assembles and markets mobile phones and devices configured to connect to wireless cellular networks. *See Cell Phones*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones> (last visited Mar. 3, 2020) (scroll to “Shop by Carrier/Network” heading).

87. LG directly infringes the '453 patent via 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing same that incorporate the fundamental technologies covered by the '453 patent to, for example, its alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers. Furthermore, upon information and belief, LG sells and makes the Accused Products outside of the United States, delivers those products to its customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products are destined for the United States and/or designing those products for sale in the United States, thereby directly infringing the '453 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013). Furthermore, LG directly infringes the '453 patent through its direct involvement in the activities of its subsidiaries, including LG USA, including by selling and offering for sale the Accused Products

directly to LG USA and importing the Accused Products into the United States for LG USA. Upon information and belief, LG USA conducts activities that constitutes direct infringement of the '453 patent under 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products. For example, and upon information and belief, LG offers for sale, sells, and imports the Accused Products within the U.S. to, for example, its distributors, customers, subsidiaries, importers, and/or consumers. Further, LG is vicariously liable for this infringing conduct of LG USA (under both the alter ego and agency theories) because, as an example and upon information and belief, LG and LG USA are essentially the same company, and LG has the right and ability to control LG USA's infringing acts and receives a direct financial benefit from LG USA's infringement.

88. For example, LG infringes claim 1 of the '453 patent via the Accused Products such as LG V30, V30+, V30S ThinQ, G7 ThinQ, V35 ThinQ, V40 ThinQ, G8 ThinQ, V50 ThinQ, and V60 ThinQ, among other LG phones sold during the statutory damages period, which are configured to connect to wireless cellular network.

89. The Accused Products implement the “method for establishing a secure tunnel to a trusted packet data gateway upon a mobile node initially attaching to or performing a handover to a target access network” of claim 1. Each of the Accused Products are mobile phones that establish a secure tunnel to a trusted packet data gateway upon the mobile phone initially attaching to or performing a handover to a target access network. This occurs when the mobile phone establishes an IPsec tunnel with an evolved packet data gateway (ePDG) in a target access network.

90. For example, the Accused Products determine from a reachability list maintained in the mobile node at least one trusted packet data gateway that is reachable through the target access network, wherein the reachability list lists data sets indicating data paths and the

reachability status of respective known trusted packet data gateways for each respective data path. For example, the Accused Products are User Equipment (“UE”). Each Accused Product has a pre-configured list (i.e., reachability list) with non-3GPP access technologies, access networks, or serving network operators that allow for trusted non-3GPP IP access. The mobile phone receives an indication of whether the non-3GPP IP access is trusted or not. The reachability list lists data path indication, including and access point name and/or an access point IP address.

91. The Accused Products establish a secure tunnel to the trusted packet data gateway determined from the reachability list maintained in the mobile node, the secure tunnel is established prior to the attachment to the target access network. For example, the 3GPP mobile phone establishes a secure IPsec tunnel to the trusted data packet gateway (ePDG) determined from the reachability list maintained in the mobile phone prior to attaching to the target access network.

92. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

93. At a minimum, LG has known of the ’453 patent at least as early as the filing date of the complaint. In addition, LG has known about the ’453 patent since at least April 14, 2020, when LG received a letter providing notice of its infringement. Further, on information and belief, LG’s conduct before the United States Patent and Trademark Office (“USPTO”) and foreign offices, suggest that it may have been aware of the ’453 patent prior to receiving the letter. For example, in prosecuting U.S. Patent Nos. 10,582,379 and 10,028,209, LG disclosed the family associated with the ’453 patent to the USPTO.

94. Upon information and belief, since at least the above-mentioned date when LG was on notice of its infringement, LG has actively induced, under U.S.C. § 271(b), distributors,

customers, subsidiaries, importers, and/or consumers that import, purchase, or sell the Accused Products that include or are made using all of the limitations of one or more claims of the '453 patent to directly infringe one or more claims of the '453 patent by using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned date, LG does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '453 patent. Upon information and belief, LG intends to cause, and have taken affirmative steps to induce infringement by distributors, importers, customers, subsidiaries, and/or consumers by at least, *inter alia*, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, testing wireless networking features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. *See, e.g., Global Network*, LG ELECTRONICS INC., <http://www.lgnewsroom.com/global-network/north-america/> (last visited Mar. 3, 2020) (stating that “[t]he company has been very active in the [North American] region as an exemplary model of globalization with success in local plants, strategic alliances, and mergers and acquisitions” and listing LG’s U.S.-based subsidiaries).

95. Upon information and belief, despite having knowledge of the '453 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '453 patent, LG has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. LG’s infringing activities relative to the '453 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant,

characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

96. SPV has been damaged as a result of LG's infringing conduct described in this Count. LG is, thus, liable to SPV in an amount that adequately compensates SPV for LG's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT V

(INFRINGEMENT OF U.S. PATENT NO. 9,042,457)

97. Plaintiff incorporates paragraphs 1 through 96 herein by reference.

98. SPV is the assignee of the '457 patent, entitled "Image Decoding Apparatus and Image Coding Apparatus with Parallel Decoding," with ownership of all substantial rights in the '457 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

99. The '457 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '457 patent issued from U.S. Patent Application No. 12/673,408.

100. LG has and continues to directly and/or indirectly infringe (by inducing infringement) one or more claims of the '457 patent in this judicial district and elsewhere in Texas and the United States.

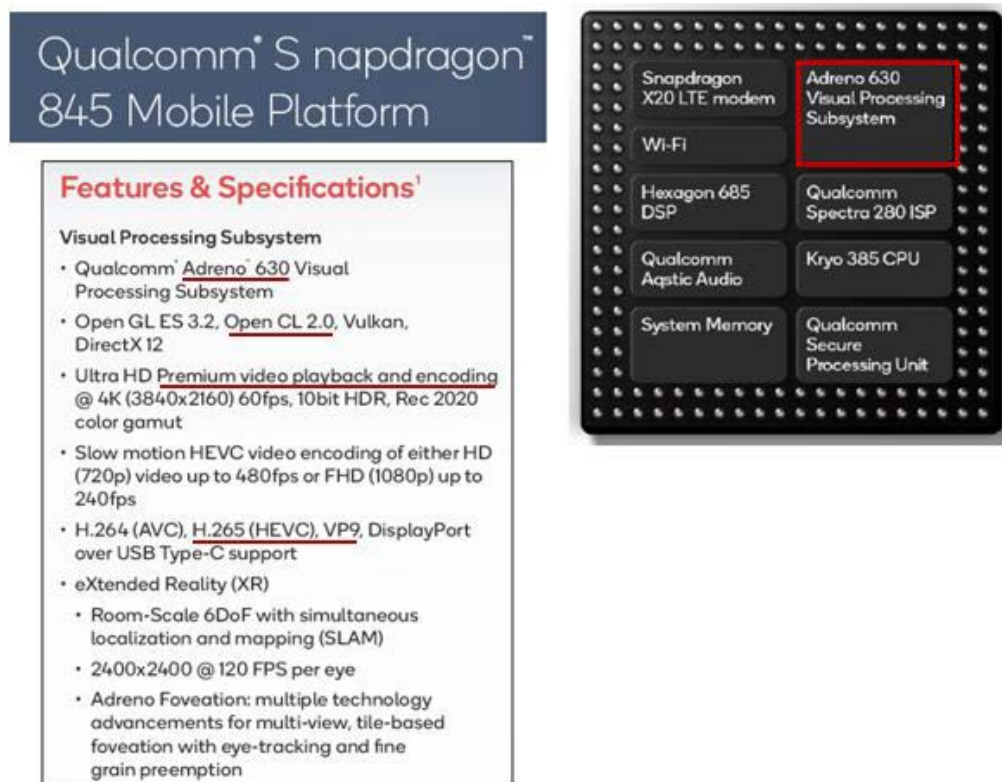
101. Upon information and belief, LG designs, develops, manufactures, assembles and markets mobile phones and devices configured to connect to wireless cellular networks. *See Cell Phones*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones> (last visited Mar. 3, 2020) (scroll to "Shop by Carrier/Network" heading). LG's mobile phones are further configured with

customer-desired features such as advanced image processing, wireless charging, AI engines, and multimedia capabilities, including video decoding. *See, e.g., LG V40 ThinQ™ Verizon Wireless*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones/lg-LM-V405UAB-verizon-v40> (last visited Mar. 5, 2020) (describing the features of the LG V40 Thin Q).

102. LG directly infringes the '457 patent via 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '457 patent to, for example, its alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers. Furthermore, upon information and belief, LG sells and makes the Accused Products outside of the United States, delivers those products to its customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products are destined for the United States and/or designing those products for sale in the United States, thereby directly infringing the '457 patent. *See, e.g., Lake Cherokee Hard Drive Techs., LLC v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013). Furthermore, LG directly infringes the '457 patent through its direct involvement in the activities of its subsidiaries, including LG USA, including by selling and offering for sale the Accused Products directly to LG USA and importing the Accused Products into the United States for LG USA. Upon information and belief, LG USA conducts activities that constitute direct infringement of the '457 patent under 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products. For example, and upon information and belief, LG offers for sale, sells, and imports the Accused Products within the U.S. to, for example, its distributors, customers, subsidiaries, importers, and/or consumers. Further, LG is vicariously liable for this infringing conduct of LG

USA (under both the alter ego and agency theories) because, as an example and upon information and belief, LG and LG USA are essentially the same company, and LG has the right and ability to control LG USA's infringing acts and receives a direct financial benefit from LG USA's infringement.

103. For example, LG infringes claim 7 of the '457 patent via the Accused Products. The Accused Products include a processor that supports various types of video encoding, such as Open CL 2.0 (a software framework used for video encoding) and H.265 (HEVC). The Accused Products perform an image decoding method using a processor, on a coded stream generated by coding, on a block-by-block basis, on a picture including coding blocks. For example, each of the Accused Products, such as the LG V40, include a processor, such as the Qualcomm SD845. The Adreno GPU of the processor decodes a coded stream generated by coding (e.g., video data), on a block-by-block basis, a picture including coding blocks.



104. The Accused Products perform, on a block group-by-block group basis, variable length decoding. For example, the processor breaks the coded stream into a series of block groups and performs variable length decoding on a wave by wave basis, a wave comprising one or more block groups.

105. The Accused Products generate block decoding information using a result of the variable length decoding for each of a plurality of block groups which (i) contain blocks, (ii) are different from each other, and (iii) are included in the coded stream. For example, the processor uses a result of the precoding. The processor determines the locations of the encoded syntax elements. The syntax elements point to the start points of the waves in the bitstream. The locations of the syntax elements are the result of the variable length decoding. The interpreted syntax elements are the block decoding information generated using the result of the variable length decoding. The plurality of waves contains blocks and each wave contains a unique set of blocks. The waves correspond to one or more rows of blocks and are included in the coded stream.

106. The block decoding information for the block group is a parameter necessary for decoding another block group from among the plurality of block groups. For example, the processor in the Accused Products implement the OpenCL framework. OpenCL Compute Units perform decoding on one of the plurality of waves in parallel. The OpenCL Compute Units decode the blocks in one of the waves by using the syntax elements, which signal the start of each wave. The waves are decoded in parallel on a block-by-block basis. Thus, the Accused Products decode, on a block-by-block basis using the block decoding information generated using the result of the variable length decoding performed in said performing, each of the plurality of block groups in parallel.

107. The decoding performed on the block-by-block basis on each of the plurality of block groups in parallel includes re-executing the variable length decoding on each of the plurality of block groups on which the variable length decoding has been performed in said performing to determine a prediction mode to be performed on the block group. On information and belief, the processor in the Accused Products includes an entropy decoding unit that re-executes variable length decoding on the blocks in the block groups – the block groups having been previously decoded during the precoding process. The entropy decoding unit determines the prediction mode in a manner generally reciprocal to the encoding process.

108. The decoding by the Accused Products includes re-executing the variable length decoding on each of the plurality of block groups on which the variable length decoding has been performed in said performing to determine a prediction mode to be performed on the block group. The processor re-executes the variable length decoding on the block groups that were previously decoded during the pre-decoding process and re-executes the variable length decoding on the blocks in the block groups. Further, the processor uses a prediction mode that is generally reciprocal to the encoding process.

109. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

110. At a minimum, LG has known of the '457 patent at least as early as the filing date of the complaint. In addition, LG has known about the '457 patent since at least April 14, 2020, when LG received a letter providing notice of its infringement.

111. Upon information and belief, since at least the above-mentioned date when LG was on notice of its infringement, LG has actively induced, under U.S.C. § 271(b), its distributors, customers, subsidiaries, importers, and/or consumers that import, purchase, or sell the Accused

Products that include or are made using all of the limitations of one or more claims of the '457 patent to directly infringe one or more claims of the '457 patent by using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned date, LG does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '457 patent. Upon information and belief, LG intends to cause, and has taken affirmative steps to induce infringement by its distributors, importers, customers, subsidiaries, and/or consumers by at least, *inter alia*, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, testing image processing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. *See, e.g., Global Network*, LG ELECTRONICS INC., <http://www.lgnewsroom.com/global-network/north-america/> (last visited Mar. 3, 2020) (stating that “[t]he company has been very active in the [North American] region as an exemplary model of globalization with success in local plants, strategic alliances, and mergers and acquisitions” and listing LG’s U.S.-based subsidiaries).

112. Upon information and belief, despite having knowledge of the '457 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '457 patent, LG has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. LG’s infringing activities relative to the '457 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such

that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

113. SPV has been damaged as a result of LG's infringing conduct described in this Count. LG is, thus, liable to SPV in an amount that adequately compensates SPV for LG's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT VI

(INFRINGEMENT OF U.S. PATENT NO. 9,414,059)

114. Plaintiff incorporates paragraphs 1 through 113 herein by reference.

115. SPV is the assignee of the '059 patent, entitled "Image Processing Device, Image Coding Method, and Image Processing Method" with ownership of all substantial rights in the '059 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

116. The '059 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '059 patent issued from U.S. Patent Application No. 13/877,389.

117. LG has and continues to directly and/or indirectly infringe (by inducing infringement) one or more claims of the '059 patent in this judicial district and elsewhere in Texas and the United States.

118. Upon information and belief, LG designs, develops, manufactures, assembles and markets mobile phones and devices configured to connect to wireless cellular networks. *See Cell Phones*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones> (last visited Mar. 3, 2020) (scroll to "Shop by Carrier/Network" heading). LG's mobile phones are further configured with customer-desired features such as advanced image processing, wireless charging, AI engines, and

multimedia capabilities. *See, e.g., LG V40 ThinQ™ Verizon Wireless*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones/lg-LM-V405UAB-verizon-v40> (last visited Mar. 5, 2020) (describing the features of the LG V40 Thin Q).

119. LG directly infringes the '059 patent via 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '059 patent to, for example, its alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers. Furthermore, upon information and belief, LG sells and makes the Accused Products outside of the United States, delivers those products to its customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products are destined for the United States and/or designing those products for sale in the United States, thereby directly infringing the '059 patent. *See, e.g., Lake Cherokee Hard Drive Techs., LLC v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013). Furthermore, LG directly infringes the '059 patent through its direct involvement in the activities of its subsidiaries, including LG USA, including by selling and offering for sale the Accused Products directly to LG USA and importing the Accused Products into the United States for LG USA. Upon information and belief, LG USA conducts activities that constitute direct infringement of the '059 patent under 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products. For example, and upon information and belief, LG offers for sale, sells, and imports the Accused Products within the U.S. to, for example, its distributors, customers, subsidiaries, importers, and/or consumers. Further, LG is vicariously liable for this infringing conduct of LG USA (under both the alter ego and agency theories) because, as an example and upon information

and belief, LG and LG USA are essentially the same company, and LG has the right and ability to control LG USA's infringing acts and receives a direct financial benefit from LG USA's infringement.

120. For example, LG infringes claim 15 of the '059 patent via the Accused Products. The Accused Products include a processor that supports various types of video encoding, such as Open CL 2.0 (a software framework used for video encoding) and H.265 (HEVC). The Accused Products implement the "image processing method for performing plural first processes, by pipelining, on a coded stream obtained by dividing an image into plural coding unit blocks according to at least two numbers of pixels and coding the image on a coding unit block-by-block basis" of claim 15. For example, the LG V40 utilizes a Qualcomm Snapdragon mobile platform (SD845) with the Adreno GPU (630) for video coding operations. The Adreno GPU has an OpenCL framework used for heterogenous processing and supports parallel wavefront processing. The Adreno GPU performs plural processes (which are pipelined) on a coded bitstream obtained by dividing an image into blocks of various pixel dimensions and coding the image on a block-by-block basis.

121. The Accused Products practice an image processing method that performs, by the pipelining, the plural first processes on the coded stream by executing each of the plural first processes. For example, The Adreno GPU uses multiple OpenCL compute units to perform video decoding on waves in parallel (e.g., wavefront parallel processing, WPP).

122. The Accused Products divide or connect portions of the coded stream into plural first processing unit blocks according to a first number of pixels, each of the first processing unit blocks having the same number of pixels in the image. For example, the Adreno GPU in the

Accused Products includes a control unit that divides the coded bitstream into slices that are further partitioned into blocks having the same number of image pixels.

123. The Accused Products practice an image processing method that includes a controlling step to cause the plural first processes to be executed for each of the first processing unit blocks. For example, the shader/streaming processor of the Adreno GPU perform a plurality of first processes on a block-by-block (e.g., prediction processing and inverse transform processing).

124. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

125. At a minimum, LG has known of the '059 patent at least as early as the filing date of the complaint. In addition, LG has known about the '059 patent since at least April 14, 2020, when LG received a letter providing notice of its infringement.

126. Upon information and belief, since at least the above-mentioned date when LG was on notice of its infringement, LG has actively induced, under U.S.C. § 271(b), its distributors, customers, subsidiaries, importers, and/or consumers that import, purchase, or sell the Accused Products that include or are made using all of the limitations of one or more claims of the '059 patent to directly infringe one or more claims of the '059 patent by using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned date, LG does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '059 patent. Upon information and belief, LG intends to cause, and has taken affirmative steps to induce infringement by its distributors, importers, customers, subsidiaries, and/or consumers by at least, *inter alia*, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining established distribution

channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, testing image processing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. *See, e.g., Global Network*, LG ELECTRONICS INC., <http://www.lgnewsroom.com/global-network/north-america/> (last visited Mar. 3, 2020) (stating that “[t]he company has been very active in the [North American] region as an exemplary model of globalization with success in local plants, strategic alliances, and mergers and acquisitions” and listing LG’s U.S.-based subsidiaries).

127. Upon information and belief, despite having knowledge of the ’059 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the ’059 patent, LG has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. LG’s infringing activities relative to the ’059 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

128. SPV has been damaged as a result of LG’s infringing conduct described in this Count. LG is, thus, liable to SPV in an amount that adequately compensates SPV for LG’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT VII

(INFRINGEMENT OF U.S. PATENT NO. 7,133,658)

129. Plaintiff incorporates paragraphs 1 through 128 herein by reference.

130. SPV is the assignee of the '658 patent, entitled "Method and Apparatus for Image Processing," with ownership of all substantial rights in the '658 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

131. The '658 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '658 patent issued from U.S. Patent Application No. 10/698,435.

132. LG has and continues to directly and/or indirectly infringe (by inducing infringement) one or more claims of the '658 patent in this judicial district and elsewhere in Texas and the United States.

133. Upon information and belief, LG designs, develops, manufactures, assembles and markets mobile phones and devices configured to connect to wireless cellular networks. *See Cell Phones*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones> (last visited Mar. 3, 2020) (scroll to "Shop by Carrier/Network" heading). LG's mobile phones are further configured with customer-desired features such as advanced image processing, wireless charging, AI engines, and multimedia capabilities, including augmented reality. *See, e.g., LG V40 ThinQ™ Verizon Wireless*, LG ELECTRONICS INC., <https://www.lg.com/us/cell-phones/lg-LM-V405UAB-verizon-v40> (last visited Mar. 5, 2020) (describing the features of the LG V40 Thin Q).

134. LG directly infringes the '658 patent via 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '658 patent to, for example, its alter egos, agents, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers. Furthermore, upon information and belief, LG sells and makes the Accused Products outside of the United States, delivers those products to its

customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products are destined for the United States and/or designing those products for sale in the United States, thereby directly infringing the '658 patent. *See, e.g., Lake Cherokee Hard Drive Techs., LLC v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013). Furthermore, LG directly infringes the '658 patent through its direct involvement in the activities of its subsidiaries, including LG USA, including by selling and offering for sale the Accused Products directly to LG USA and importing the Accused Products into the United States for LG USA. Upon information and belief, LG USA conducts activities that constitute direct infringement of the '658 patent under 35 U.S.C. § 271(a) by making, offering for sale, selling, and/or importing those Accused Products. For example, and upon information and belief, LG offers for sale, sells, and imports the Accused Products within the U.S. to, for example, its distributors, customers, subsidiaries, importers, and/or consumers. Further, LG is vicariously liable for this infringing conduct of LG USA (under both the alter ego and agency theories) because, as an example and upon information and belief, LG and LG USA are essentially the same company, and LG has the right and ability to control LG USA's infringing acts and receives a direct financial benefit from LG USA's infringement.

135. For example, LG infringes claim 1 of the '658 patent via the Accused Products. The Accused Products are configured to implement image processing through applications such as "AR Sticker." The Accused Products detect a position of a human body part area in an input image including a human body image. For example, the Accused Products use Qualcomm's Artificial Intelligence—Neural Processing SDK to detect a position of a user's nose in an input image, which includes the user's body image (e.g., the user's face).

136. The Accused Products determine a point of origin of a local coordinate system of an ornament image having a move locus according to the detected position of the human body part area in the input image. For example, the Accused Products utilize ornament images (e.g., “AR Stickers”) stored on the LG phones. The Accused Products also utilize its AI Engine to determine a point of origin of a local coordinate system of the ornament image. Each ornament image has and uses information (e.g., absolute and relative position, rotational data) that comprises a move locus of the ornament image according to the detected position of the user’s face.

137. The Accused Products determine arrangement information of the ornament image according to the determined point of origin and the move locus. The Accused Products determine an arrangement information of the sticker according to the determined point of origin and the move locus such as the absolute and relative position and rotational data.

138. The Accused Products generate an output image by composing the ornament image and the input image based on the determined arrangement information. For example, the Accused Products generate an output image by superimposing the AR sticker over the detected user’s face in the input image while harmonizing the composition when the user moves.

139. The Accused Products output the generated output image. For example, the Accused Products display the output image on the screen of the Accused Product.

140. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

141. At a minimum, LG has known of the ’658 patent at least as early as the filing date of the complaint. In addition, LG has known about the ’658 patent since at least April 14, 2020, when LG received a letter providing notice of its infringement. Further, on information and belief, LG’s conduct before the United States Patent and Trademark Office (“USPTO”) and foreign

offices, suggest that it may have been aware of the '658 patent prior to receiving the letter. For example, in prosecuting U.S. Patent Application No. 11/376,195, LG disclosed the family associated with the '658 patent to the USPTO.

142. Upon information and belief, since at least the above-mentioned date when LG was on notice of its infringement, LG has actively induced, under U.S.C. § 271(b), its distributors, customers, subsidiaries, importers, and/or consumers that import, purchase, or sell the Accused Products that include or are made using all of the limitations of one or more claims of the '658 patent to directly infringe one or more claims of the '658 patent by using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned date, LG does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '658 patent. Upon information and belief, LG intends to cause, and has taken affirmative steps to induce infringement by its distributors, importers, customers, subsidiaries, and/or consumers by at least, *inter alia*, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, distributing or making available instructions or manuals for these products to purchasers and prospective buyers, testing image processing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers in the United States. *See, e.g., Global Network*, LG ELECTRONICS INC., <http://www.lgnewsroom.com/global-network/north-america/> (last visited Mar. 3, 2020) (stating that “[t]he company has been very active in the [North American] region as an exemplary model of globalization with success in local plants, strategic alliances, and mergers and acquisitions” and listing LG’s U.S.-based subsidiaries).

143. Upon information and belief, despite having knowledge of the '658 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '658 patent, LG has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. LG's infringing activities relative to the '658 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

144. SPV has been damaged as a result of LG's infringing conduct described in this Count. LG is, thus, liable to SPV in an amount that adequately compensates SPV for LG's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

CONCLUSION

145. Plaintiff SPV is entitled to recover from LG the damages sustained by Plaintiff as a result of LG's wrongful acts, and willful infringement, in an amount subject to proof at trial, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court.

146. Plaintiff has incurred and will incur attorneys' fees, costs, and expenses in the prosecution of this action. The circumstances of this dispute may give rise to an exceptional case within the meaning of 35 U.S.C. § 285, and Plaintiff is entitled to recover its reasonable and necessary attorneys' fees, costs, and expenses.

JURY DEMAND

147. Plaintiff hereby requests a trial by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

PRAYER FOR RELIEF

148. Plaintiff respectfully requests that the Court find in its favor and against LG, and that the Court grant Plaintiff the following relief:

1. A judgment that LG has infringed the Asserted Patents as alleged herein, directly and/or indirectly by way of inducing infringement of such patents;
2. A judgment for an accounting of all damages sustained by Plaintiff as a result of the acts of infringement by LG;
3. A judgment and order requiring LG to pay Plaintiff damages under 35 U.S.C. § 284, including up to treble damages as provided by 35 U.S.C. § 284, and any royalties determined to be appropriate;
4. A judgment and order requiring LG to pay Plaintiff pre-judgment and post-judgment interest on the damages awarded;
5. A judgment and order finding this to be an exceptional case and requiring LG to pay the costs of this action (including all disbursements) and attorneys' fees as provided by 35 U.S.C. § 285; and
6. Such other and further relief as the Court deems just and equitable.

Dated: April 14, 2020

Respectfully submitted,

/s/ Patrick J. Conroy

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